

**1 447 724**

# PATENT SPECIFICATION

(11) **1 447 724**

- (21) Application No. 6882/74 (22) Filed 15 Feb. 1974  
(31) Convention Application No. 2311293  
(32) Filed 7 March 1973 in  
(33) Germany (DT)  
(44) Complete Specification published 25 Aug. 1976  
(51) INT CL<sup>2</sup> B60S 1/38  
(52) Index at acceptance

A4F 24B2A3B1B 24B2A3B2A1 24B2A3B2A2



## (54) WIPER BLADE ASSEMBLY

5 (71) We, SWF-SPEZIALFABRIK FUER AUTOZUBEHOER GUSTAV RAU GMBH., 17, Ludwigsburger Strasse, 712 Bietigheim, Wuertemberg, Germany (Fed Rep); a German body corporate, do hereby declare the invention, for which we pray that a patent may be granted us, and the method by which it is to be performed, to be particularly described in and by the following statement:

10 The invention relates to a wiper blade assembly as used for windscreens wiper installations of vehicles, more particularly automotive vehicles, comprising a wiper blade having inserted spring strips and being secured in a wiper blade mounting.

15 Various requirements are made to such a wiper blade assembly. On the one hand it should be so designed that it can be mass produced cheaply, on the other hand with wrap-around or curved windscreens it should be capable of being applied to the whole length of the windscreens to be wiped with sufficient pressure. Finally, for aerodynamic reasons such a wiper blade assembly should have a low overall height.

20 For obtaining an adequately uniform pressure application in many of the known wiper blades the wiper blade mounting is formed of a main yoke and intermediate or clawed yokes hingedly connected thereto, so as to obtain several support points for the wiper blade at which the transmission of the pressure application occurs. Hence there 25 are various connecting methods and configurations, whereby especially one- or two-armed intermediate or clawed yokes are used.

25 The main yoke and the intermediate yoke have already been made integrally of plastics material, whereby so-called web hinges, i.e. material reductions, take over the function of the previous mechanical hinges. In such a wiper blade the number of components and hence the expenditure in assembly time is considerably reduced. The distribution of the pressure is still limited to a few support positions and moreover this

integral wiper blade mounting occupies a considerable overall height.

50 It is an object of the invention to improve a wiper blade of the kind referred to above so that by reducing the overall height of the wiper blade a uniform distribution of pressure is obtained over the entire length of the wiper blade.

55 According to the present invention there is provided a wiper blade assembly for windscreens wiper installations of vehicles, more particularly automotive vehicles, comprising a squeegee, spring blades inserted in longitudinal grooves of the squeegee and a wiper blade mounting in which the squeegee and the spring blades are secured, wherein the wiper blade mounting is made of plastics material and is formed as a longitudinally curved yoke and has a substantially U-shaped transverse cross-section, said yoke being provided with guide elements for the spring blades extending along substantially the whole length of the yoke and being located at the inner surfaces of the longitudinal edges of the yoke.

60 In this form of wiper blade mounting the squeegee having inserted spring strips is guided and supported substantially over the whole length. The U-shaped yoke used permits a low overall height, whereby the natural resilience thereof produces the necessary adaptability to differently curved windscreens.

65 The connection of such a wiper blade assembly to the wiper arm is simplified in that a receiving member with bearing pin, engageable with a connecting member of the wiper arm end, is formed on the yoke.

70 The axial retention of the wiper blade strip in the yoke may be achieved in that one end of the yoke is terminated by a permanent closure web, and the other end of the yoke is terminated by a displaceable closure web. The displaceable closure web permits insertion and interchanging of the wiper blade.

75 The displaceability of the closure web may be obtained simply in that the closure

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web is spaced from adjacent parts of the yoke by longitudinal slots which extend as far as the web hinge.

The suitable location of the squeegee on this yoke may be attained in that the wiper blade has longitudinal grooves on both sides in which the spring strips are inserted, and that these spring strips partly project from these longitudinal grooves and engage with the longitudinally extending guide elements of the yoke.

So that the yoke may be easily produced in an injection moulding tool the guide elements on the inside surfaces of the shank of the yoke may be formed as alternate recesses and apertures, the recesses being open towards the end face of the associated shank, and the apertures extending through the shank. The apertures in the shanks of the yoke may hence be readily formed by means of a slider and the shaped part determining the interior of the U-shaped yoke removed from the mould in the normal direction of movement of the mould.

To obtain a uniform location of the wiper blade on both longitudinal sides the recesses and the apertures are preferably formed of the same length and uniformly spaced in the longitudinal direction of the yoke and preferably a recess in one shank is located opposite an aperture in the other shank and vice versa.

The individual apertures are formed so that the width of the aperture corresponds to the thickness of the spring blades and that these apertures are substantially equidistantly spaced from the end faces of the shank of the yoke. The recesses extend inwardly from the end faces of the shanks a distance substantially double the thickness of the spring blades. The recesses and apertures thus form a continuous supporting surface for the spring strips.

The invention will be described further, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a longitudinal section of a wiper blade assembly;

Figure 2 is a cross-section through the wiper blade assembly of Figure 1 taken on the line II—II;

Figure 3 is a fragmentary section taken on the line III—III of Figure 2;

Figure 4 is a fragmentary section taken on the line IV—IV of Figure 3;

Figure 5 is a fragmentary section taken on the line V—V of Figure 3;

Figure 6 is a fragmentary section through an end region of the wiper blade assembly of Figure 1, and

Figure 7 is a plan view of the end region of the wiper blade assembly of Figure 6.

As shown in Figures 1 and 2, the wiper blade mounting in accordance with the

invention includes a curved yoke 10 which has a substantially U-shaped cross-section, injection moulded from plastics material. In the medial region of the yoke on the upper surface a receiving member 11 with bearing pin 12 is formed. A two-shanked stop spring 13 is pivotally mounted on the bearing pin 12. A hook-shaped end 16 of a wiper arm to which the wiper blade assembly is to be attached is located over the stop spring 13 and latched thereon by the stop projection 14 which engages in a stop aperture 15 of the end 16 of the wiper arm.

One end of the wiper blade yoke 10 is terminated by a closure web 17. On the other end a closure web 19 is provided which is displaceable. This is achieved in that a part 18 of the end region of the yoke 10 is connected to the remainder of the yoke via a web hinge 20, as shown in greater detail in Figure 6. Since the closure web 19 does not extend across the whole width of the yoke 10, then a spacing of the part 18 from the shanks 23 and 24 of the yoke is required. This is obtained by providing slots 30 as shown in Figure 7. The lateral parts 29 in this end region remain rigidly connected to the yoke 10.

With the closure web 19 displaced into its open position 19' a wiper blade 22, having spring strips 21 inserted on both sides in longitudinal grooves 25 thereof may be inserted in the receiving channel formed in the yoke 10. The spring strips 21 project from the wiper blade 22 and are guided and retained by guide elements on the inside surfaces of the shanks 23 and 24 defining the receiving channel of the yoke 10.

These guide elements are in the form of grooves 26 and apertures 27. The grooves 26 formed in the inside walls of the shanks 23 and 24 and are open towards the longitudinal end faces of the shanks 23 and 24. The width of the apertures 27 equals the thickness of the spring strips 21. These apertures 27 are spaced from the end faces of the shanks 23 and 24 a distance substantially equal to the thickness of the spring strips 21 forming supports 28 for the spring strips 21 in the region of these apertures 27.

The upper edges of grooves 26 are flush with the upper edges of the apertures 27, so that a continuous supporting surface 31 is provided for each of the spring blades 21. As shown by Figure 3, the grooves 26 and the apertures 27 may be of equal length and alternate over the length of the wiper blade. It is advantageous if the groove 26 in the shank 24 is opposite an aperture 27 in the shank 23 and vice versa.

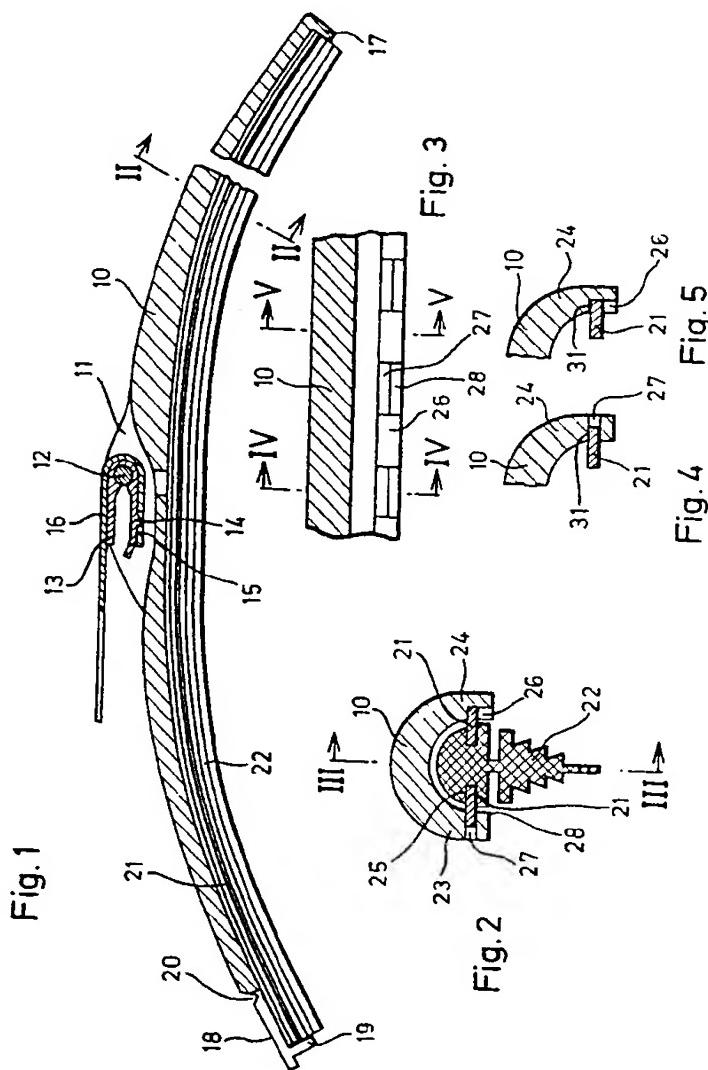
#### WHAT WE CLAIM IS:—

1. A wiper blade assembly for windscreen wiper installations of vehicles, more

- particularly automotive vehicles, comprising a squeegee, spring blades inserted in longitudinal grooves of the squeegee and a wiper blade mounting in which the squeegee and the spring blades are secured, wherein the wiper blade mounting is made of plastics material and is formed as a longitudinally curved yoke and has a substantially U-shaped transverse cross-section, said yoke being provided with guide elements for the spring blades, extending along substantially the whole length of the yoke and being located at the inner surface of the longitudinal end edges of the yoke.
5. A wiper blade assembly as claimed in claim 1, wherein the yoke is provided with a receiving recess and a pivot pin engageable with a separate connecting member of a wiper arm.
10. A wiper blade assembly as claimed in claim 1 or 2, wherein one end of the yoke is terminated by a permanent closure web and the other end of the yoke is terminated by a closure web displaceable by means of a web hinge.
15. A wiper blade assembly as claimed in claim 3, wherein the displaceable closure web is spaced from adjacent parts of the yoke by means of longitudinal slots extending to the web hinge.
20. A wiper blade assembly as claimed in any one of claims 1 to 4, wherein the squeegee is provided on both sides with longitudinal grooves in which the spring blades are inserted so that the spring blades partly project from these longitudinal grooves of the squeegee and are guided by means of the guide elements of the yoke.
25. A wiper blade assembly as claimed in
- any one of claims 1 to 5, wherein the guide elements along the yoke are formed alternately as grooves and apertures, the grooves are open to the longitudinal end faces of the yoke, while the apertures extend through the shanks of the yoke.
30. A wiper blade assembly as claimed in claim 6, wherein the grooves and the apertures have the same dimensions in longitudinal direction of the yoke and are alternately distributed along the yoke.
35. A wiper blade assembly as claimed in claim 6 or 7, wherein a groove in one shank is located opposite to an aperture in the other shank of the yoke.
40. A wiper blade assembly as claimed in
- any one of claims 6 to 8, wherein the grooves extend inwardly of the shanks from the longitudinal end faces of the shanks a distance double the thickness of the spring blades, wherein the width of the apertures corresponds to the thickness of the spring blades and wherein these apertures are located at a distance from the end edge faces of the shanks equal to the thickness of the spring blades.
45. A wiper blade assembly for windscreen wiper installations of vehicles substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.
50. POTTS, KERR & CO., Chartered Patent Agents, 15, Hamilton Square, Birkenhead, Merseyside, L41 6BR, and 55. 9, Warwick Court, London, WC1R 5DJ.
55. 60. 65. 70.

Printed for Her Majesty's Stationery Office, by the Courier Press, Leamington Spa, 1976.  
Published by The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from  
which copies may be obtained.

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Sheet I



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Sheet 2

Fig. 6

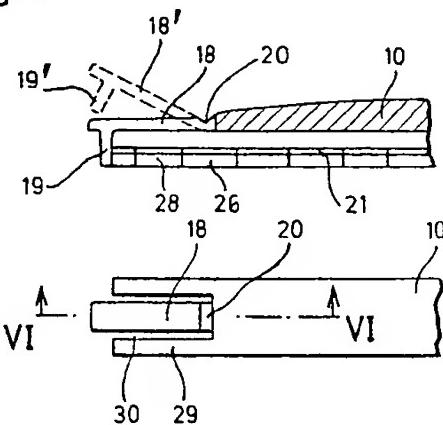


Fig. 7